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The effect of dopants on magnetic properties of the ordered FE 65-XAL35-YMX,Y (MX,Y=GA,B,V; X,Y=5,10) alloys

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Abstract

The results of X-ray diffraction, complex in-field (up to 9 T) and temperature (5-300 K) Mössbauer and magnetometric studies of the ordered Fe65Al35-xMx (M=Ga, B; x=0,5,10) and Fe 65-xVxAl35(x=5,10) alloys are presented. Analysis of the magnetometry studies shows that the systems Fe 65Al35 H Fe65Al35-xGax (x=5, 10) are characterized by two different magnetic states with essentially distinguishing hysteresis loops and AC susceptibility values. The temperature and external magnetic field values inducing the transition from one magnetic state to another are higher in the Ga-doped alloys than in the reference Fe 65Al35 alloy. The boron addition transforms the magnetic state of the initial alloy Fe65Al35 into a ferromagnetic one exhibiting high magnetic characteristics. Substitution of V for Fe in the ternary alloys Fe65-xVxAl35 results in reduction of magnetic characteristics and collapsing of 57Fe hyperfine magnetic filed. © (2012) Trans Tech Publications.

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Keywords

Hysteresis cycles, Magnetic characteristics, Mössbauer spectra